

free from pain. Reported on September 15th, feeling very well and steadily gaining in weight; had no return of the pain.

Case 5. Mr. W. J. C., age 30 years. For the past 2 years he has suffered from pain and distress in the stomach after eating, associated with fermentation and progressive loss of weight and strength; lost 25 pounds in a year and a half; pain comes on immediately after eating; there has been no nausea or vomiting, bowels quite constipated; present weight 126 pounds. Diagnosis of chronic gastric ulceration made. Operation advised and accepted. On September 29, 1904, posterior gastro-enterostomy was done, site of opening of jejunum being about four and a half inches from duodeno-jejunal junction. Recovery was uneventful. He left the hospital on November 2d, feeling very well and able to eat and digest regular food without any discomfort; weight 133 pounds. reported December 29th, feeling very well, appetite and digestion good. Weight has increased to 156 pounds. On March 19, 1905, condition as reported December 29th.

Case 6. Miss S., age 30 years. For the past eight years has had considerable trouble with her stomach; in October, 1897, had, what she termed, a severe bilious attack; was nauseated; vomited for several days; her physician put her on a liquid diet for one month, at the end of which time she was allowed to take selected solid food. From this time until 1900 she had several such attacks. In August of that year had an especially severe one, attended with nausea, vomiting, epigastric distress, swelling and ulceration of the mucous membrane of mouth, being especially severe on the gums and tongue; breath was very offensive. In November of the same year had a similar attack. She came under my care in February, 1901, suffering from one of those attacks. I thought at first it was caused by mercurial salivation, for the symptoms were identical; saliva was drooling from the mouth; the gums were swollen and ulcerated; tongue heavily coated and covered with ulcers; breath foul; had epigastric pain; was nauseated and could not retain any food for several days. As she had taken no mercurial preparations whatever, in fact had not taken any medicine for some time previous, I was compelled to attribute the trouble to a chronic catarrhal condition of the stomach. After the attack passed away I advised her to consult a dentist, which she did; he stated that her teeth were sound and no local condition present to account for her trouble. During 1901 she had several attacks as described above, about one in every four or six weeks, lasting from ten to fourteen days. In 1902, in addition to dietetic treatment, gastric lavage was resorted to, the stomach being washed out every day for two months, then two or three times a week for one year; very little benefit resulted from this, the attacks recurring about every two months, and being just as severe. Various drugs were tried without effect; conditions remained unchanged up to January 19, 1905, when a posterior gastro-enterostomy was done. A number of cicatrices were seen on the stomach near the pylorus. Recovery was uneventful. She left the hospital on February 11th, feeling well, had a good appetite, was gaining weight and took solid food with impunity for the first time in four or five years. On March 13th, reported steadily gaining weight and strength, had gained 10 pounds since she left the hospital, appetite is good and she feels well.

CONTAMINATION OF WATER SUPPLIES.*

By N. K. FOSTER, M. D., Sacramento.

THE value of a pure water supply for domestic purposes has been appreciated since the earliest advent of civilization, and it is doubtful if it was not prized more highly several hundred years ago than it is today. Cities sprang up and grew to a large size where pure water was plenty, and if, for other causes, they were forced into existence where it was not, no amount of money or effort was considered too great to bring it to their doors. The great aqueducts of Rome are familiar to all. Before the Christian Era, 160 miles of these aqueducts had been built and in the next 300 years, 210 more had been added. This aggregate of 370 miles, composed of separate aqueducts, ranging from 2 to 61 miles in length, brought a supply of over 332,000,000 gallons per day of pure mountain water to that city. This is but one of the many ancient water works which in vastness puts to shame the systems of today.

The ancients fully understood the value of pure water and the danger of using that which was polluted, and while knowing nothing of the germ theory of disease, had recognized the fact that impure water was a cause and had adopted many of our so-called modern methods of avoiding it. Hippocrates, 400

years before Christ, advised boiling and filtering water as a protection against disease.

It would seem useless to speak of the necessity of pure water were it not for the frequency with which we hear so-called leaders in social and political affairs speak slightly of any effort to better the conditions of the domestic water supply. This is sometimes through ignorance, but more often through the fear that anything said against their water will hurt their locality. They will argue that a water, filled with mud known to contain the sewage of large towns, is pure and healthful, on the ground that they have drunk it for years. They deprecate exceedingly any effort to improve it from the foolish fear that some competing town will know they have a poor supply. They little appreciate the story that their death list tells, or the power of observation of their neighbors. The cost is often, and perhaps more frequently than any other, the excuse for the use of polluted water, but as an investment, entirely outside the sanitary aspect, a city can make no better than in pure water. It is the progressive city—the city that considers no effort too severe, no expense too great to get pure water—that grows.

Water is essential to life. More than 50% of the weight of the human body is water, and it enters more largely into the composition of food than any other constituent. The health, growth, and very existence of the individual depends upon its character, and as the well being of the community is the object of government, it is their duty to provide a pure supply.

Hill, in "Public Water Supplies," says: "The pumping of water for domestic purposes from a source known to be polluted by sewage or otherwise should be entirely condemned. The delivery of water containing the elements of fatal disease to a confiding and helpless community should be ranked with the sale of intoxicating liquors to minors and confirmed inebriates. An attempt to kill people by the systematic distribution of a poison would be met by the apprehension and punishment of the offender; while the delivery of water for drinking, and other dietetic uses, as fatal to some as a dose of strychnine, is going on in nearly every large city of the land. Shall we shut our eyes to the fact that polluted water is dangerous to health, or shall we recognize the evil, and address ourselves to its remedy?"

The people are awakening to the danger and demanding of their governments the protection due them, but the awakening is often the result of a severe epidemic which has cost much suffering and many lives. That California, full of sparkling mountain streams fed from pure snow and springs, is giving to many of her people this same water, filled with the filth of human excreta, needs but a trip of observation to prove. It might be well to recount the experience of a recent trip of inspection. Along one stream furnishing water for domestic purposes to probably 40,000 people, there are during the summer months, when the water is low, no less than 10,000 people using that stream as a sewer. There are many summer resorts where invalids and those recovering from acute diseases, including those that are water borne, pouring their unpurified filth, loaded as it is with disease germs, into that stream, often not many rods above where another resort takes the water for domestic purposes, to again turn it back with increased pollution, for those below.

In one place where the County Health Officer was making an earnest effort to have a new town clean up and adopt a system of sewage disposal other than the river, I saw what impressed me deeply with the need of education along sanitary lines. The order had gone out from the Health Officer to clean up, and it was being obeyed with a reasonable amount of good cheer. I walked down the stream with the Health Officer and Constable to see the chance for

* Read at the meeting of the California Public Health Association, San Francisco, October 28, 1905

locating a septic tank when we came upon a man unloading manure from a two-horse wagon in the middle of the stream. This was but a short distance above the water intake of a large town, and there is a great probability that the man did not know that he was doing anything wrong. There are innumerable private camps along this stream, each one adding more to the pollution of the stream than a half dozen families living along its banks. Is it any wonder that typhoid prevails throughout that valley?

This stream is no exception; others are equally bad or worse, and the time is fast coming when with the rapid growth which California is bound to have, our streams will become what they are in many other States, mere sewers, and it will be said of our streams as M. O. Leighton says in his report to the Department of the Interior on "Normal and Polluted Waters in the Northeastern States":

"The Blackstone is the most polluted river in New England; its name has become synonymous with filth. The headwaters of a river system are usually free from pollution, but in this case the opposite is true. The sewage from the city of Worcester befouls the river almost at its source, and thereafter throughout its whole extent the Blackstone is a damaged resource to the country. Such is the accumulation of filth in the mill ponds that from some of those near Worcester there arise odors that are detrimental to comfort and really, if not to health. The use of its water in boilers has long been abandoned, and it cannot be used in the manufacture of light-colored cloths."

Such pollution besides being a menace to health, will finally destroy the valuable fishing industries of our largest river. Thousands of pounds of salmon are now caught in our rivers, but when they become, as has the Blackstone—a sewer—the fish will disappear and go to those who exercise better judgment and business ability. This is of small account when compared with the loss of life and health, but it is the financial loss that more quickly awakens the people.

The sources of pollution are many, but they may be divided, for our convenience into unavoidable and avoidable. Fortunately most of them belong to the second class. During the rainy season there is a vast amount of water washed into the streams from the adjoining hills and pastures, much of which is bad, but the dry, hot weather and bright sun, both of which are excellent germicides, have killed the greater part of the disease germs.

The larger rivers are used for navigation and are subject to the pollution incident to it, but this is of small moment and can be cared for by filtration, and no city having due regard for the welfare of its inhabitants will use the water from such rivers, without its being filtered.

The causes of pollution in which we are most interested as sanitarians, are the avoidable, and which are at the same time, the most dangerous to health. Chief among these is the sewage of towns. The custom has grown up, and is almost universal in this State, to empty all sewage into the nearest water course. This is in violation of the riparian rights of owners through whose land the water flows, and if such streams are used for domestic supplies, is in violation of State laws. Not only is it a violation of law, it is the direct cause of much sickness and death. Cholera, that great epidemic scourge which has swept millions off the earth, is still active and travelling down polluted rivers in other countries. What might be the result if a case should get into our State at the headwaters of one of our great rivers which furnishes water for thousands of the inhabitants?

Typhoid, that other water borne curse, while not cutting such a wide swath as cholera, keeps mowing, and during the run of years kills more. This is on almost every stream in the State and the death rate,

if properly collected, would be appalling. There are other ways of disposing of the sewage, and the practice should be stopped. Corrals for domestic animals are often built upon the bank of a convenient stream and stables are extended over it, so as to easily dispose of the refuse. This, like polluting the streams with sewage, is in violation of the law. The carcasses of domestic animals which have died of contagious diseases, such as glanders and anthrax, are often thrown into the stream. Another and perhaps as dangerous a source of pollution is the summer camper. Camping is a healthful way of spending the summer months, and should be encouraged, but not allowed where it will endanger the lives of others. Being transient, with no accommodations to dispose of waste material, it goes into the stream. The same stream serves for a bath and place to soak and wash the soiled clothing. Indeed, everything goes to this convenient place of disposal. Water companies owning their water shed rightfully reject them, and there should be State regulations governing the conditions under which it is allowed. There are many places where camping could be enjoyed unrestricted, and where no damage could possibly result, but the State has a right, and it is its duty to see that campers do not endanger others.

I have spoken so far of streams, but it applies with even greater force to lakes and artificial reservoirs, for they are filled from streams and the accumulations of filth make them very offensive, to use no harsher term.

There is another great water supply which needs perhaps more care than artificial reservoirs or streams. I refer to the wells throughout the State. These are dug or driven generally with sole reference to the ease of the housewife. This is a commendable purpose, if, as a result a worse evil is not encountered. If we examine the premises closely we too often find the privy has been built with the same idea, and is but a few feet or yards away. Almost invariably the vault is a simple hole dug in the ground and is seldom cleaned. The soil for many feet becomes impregnated with filth, and during the rainy season it easily finds access to the well. The discharge from the kitchen sink and the washings from the pig sties and cattle corrals not infrequently find entrance to the well and add their wealth of pollution. The water is generally pumped to a tank above, which is merely covered with a roof and is exposed to the contaminating influence of dust, which may contain disease germs and certainly does filth, to birds who roost upon the edge and not infrequently are drowned in the water, to flies and other insects which may have upon them the germ of water borne disease, or even the venturesome cat may end her career in its filthy depths. No wonder that typhoid is a country disease and that diarrheal troubles exist.

I have thus briefly and imperfectly gone over a few of the sources of pollution, by no means completing the list, but hoping that it will at least call out discussion.

Gonorrhea as a Cause of Death.

Joseph Taber Johnson, Washington, D. C., (*Journal A. M. A.*, March 11), reviews the opinions of authorities as to the effects of gonorrhea in producing female sterility and disease, and states his belief that if the mortality from this cause could be ascertained it would be found to equal that from either typhoid fever, pneumonia or tuberculosis, and that possibly it might be found to exceed the mortality from all three diseases. He thinks that gonorrhea is the cause of at least 30 per cent of the deaths among prostitutes, and that through its later effects on the generative organs it may be the cause of death in a very large number of virtuous married women.